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14. ABSTRACT This final report covers the extension period of this contract from August 1, 2014 to November 14, 2014. During this final period we continued research on conducting and non-conducting polymer nanofibers. Five High School students worked with me during the Summer 2014 and part of the Fall 2014 semester. Most of their research was related to conducting, non-conducting polymers and MoS2. Their work mainly consisted in sample preparation, running the experiments and simple data analysis. Two of these students participated in the High School Science Fair. The goal was to motivate these students to do some basic research and to choose a career in Science upon					
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a. REPORT UU	b. ABSTRACT UU	c. THIS PAGE UU			19b. TELEPHONE NUMBER 787-850-9381

Report Title

Final Report: Training High School students in the scientific method via hands on projects in a laboratory environment

ABSTRACT

This final report covers the extension period of this contract from August 1, 2014 to November 14, 2014. During this final period we continued research on conducting and non-conducting polymer nanofibers. Five High School students worked with me during the Summer 2014 and part of the Fall 2014 semester. Most of their research was related to conducting, non-conducting polymers and MoS₂. Their work mainly consisted in sample preparation, running the experiments and simple data analysis. Two of these students participated in the High School Science Fairs. The goal was to motivate these students to do some basic research and to choose a career in Science upon graduating from High School.

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

<u>Received</u>	<u>Paper</u>
07/25/2014	6.00 Pablo I. Sepulveda, Alexander O. Rosado, Nicholas J. Pinto. Dielectric spectroscopy of [P(NID2OD-T2)] _n thin films: Effects of UV radiation on charge transport, Thin Solid Films, (07 2014): 0. doi: 10.1016/j.tsf.2014.07.007
07/25/2014	8.00 Alexander O. Rosado, Nicholas J. Pinto. Electrospun fibers of [P(ND12OD-T2)] _n on p-doped Si: Fabrication of a sub-micron size p-n junction diode, INTERNATIONAL Journal of Chemical Engineering, (07 2013): 0. doi:
08/07/2012	2.00 David Delgado, Freddy Wong, Omar Vega, Rosette Gonzalez, Luis G. Rosa. Nanoscale Fabrication of the Ferroelectric Polymer Poly(vinylidene Fluoride with Trifluoroethylene) P(VDF-TrFE) 75:25 Thin Films by Atomic Force Microscope Nanolithography, Scanning, (04 2012): 0. doi: 10.1002/sca.21024
08/08/2013	5.00 William Serrano, Nicholas J. Pinto. Electrospun Fibers of Poly(Vinylidene Fluoride-Trifluoroethylene)/Poly (3-Hexylthiophene) Blends from Tetrahydrofuran, Ferroelectrics, (01 2012): 0. doi: 10.1080/00150193.2012.707830
TOTAL:	4

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

<u>Received</u>	<u>Paper</u>
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TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Electrospun fibers of Poly lactic acid/Polyaniline at low polymer concentrations, W. Serrano, A. Mélen­dez, I. Ramos and N.J. Pinto, American Chemical Society Fall Meeting, San Francisco, CA (August 2014).

Number of Presentations: 1.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

<u>Received</u>	<u>Paper</u>
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TOTAL:

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

<u>Received</u>	<u>Paper</u>
08/08/2012	3.00 Nicholas Pinto, William Serrano. COMPOSITE NANOFIBERS OF ELECTROACTIVE POLYMERS PREPARED VIA ELECTROSPINNING, 15th European Conference on Composite Materials. 24-JUN-12, . : ,
08/08/2012	4.00 William Serrano, Nicholas Pinto. Electrospun fibers of poly (vinylidene fluoride-trifluoroethylene)/ poly (3-hexylthiophene) blends from tetrahydrofuran, National Conference on Undergraduate Research. 29-MAR-12, . : ,
08/11/2014	7.00 Alexander O. Rosado, Nicholas J. Pinto. Effect of Ultraviolet Irradiation on an n-Doped Semiconductor Thin Film Transistor, . , . : ,
08/11/2014	9.00 Alexander O. Rosado, Nicholas J. Pinto. Dual Input Logic AND Device Fabricated Using an n-doped Semiconductor: Effects of UV Light on Charge Mobility, National Conference on Undergraduate Research. 11-APR-13, . : ,
TOTAL:	4

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

<u>Received</u>	<u>Paper</u>
08/07/2012	1.00 William Serrano, Nicholas Pinto. Electrospun fibers of poly(vinylidene fluoride-trifluoroethylene)/poly(3-hexylthiophene) blends from tetrahydrofuran, Ferroelectrics (12 2011)
TOTAL:	1

Number of Manuscripts:

Books

Received Book

TOTAL:

Received Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Nicholas Pinto was chosen to be included in the Marquis Who's Who in America

Graduate Students

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Names of Post Doctorates

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Names of Faculty Supported

<u>NAME</u>	<u>PERCENT SUPPORTED</u>	National Academy Member
Nicholas Pinto	0.00	
Luis Rosa	0.00	
FTE Equivalent:	0.00	
Total Number:	2	

Names of Under Graduate students supported

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period: 0.00

The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:..... 0.00

Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):..... 0.00

Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense 0.00

The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields:..... 0.00

Names of Personnel receiving masters degrees

<u>NAME</u>
Kety Jimenez
Total Number:

Names of personnel receiving PHDs

<u>NAME</u>
Total Number:

Names of other research staff

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

The major scientific accomplishments in this proposal were submitted in the IPR's. During this extension period, the PI worked with High School Students during the summer 2014 and part of the Fall 2014 semester. The accomplishments were thus limited to training these students in the scientific process. Given below is a brief description of the research undertaken by these students.

i) Andy Lopez (11th grade) worked in my lab during the summer 2014, his project was to prepare FET's and diodes using exfoliated MoS₂ thin films. It was difficult at the beginning, but as the summer progressed he was able to get fairly thin films and make the devices.

ii) Faviola Marrero (11th grade) worked on the preparation of PEDOT-PSSA thin films and fibers for alcohol gas sensing. She learned to prepare fibers and films and make a gas sensor. Then she learned to analyze the data and how to calculate response and recovery times and the sensitivity of the sensors.

iii) Victoria Pinto (10th grade) worked on the coaxial electrospinning of polymers with the goal of being able to make hollow fibers. She learned the electrospinning technique and how to make polymer solutions. She learned how to use the SEM to take images of her fibers.

iv) Mereliz Fuertes (12th grade) worked on making PEDOT-PSSA thin films for use as glucose sensors. She was able to make the sensors and part of the project involved making glucose solutions of different molarity. This work was presented at the local science fair. Mereliz won a prize in the district competition of the science fair and will make in to the regional competition.

v) Maybelline Caban (11th grade) worked on the fabrication of a capacitor using a thin film of PVDF-TrFE as the dielectric. She was successful with using a thin film but the capacitor made from electrospun fibers did not work as there would always be a short between the capacitor terminals. She worked in close collaboration with Pablo who was the expert in the use of the Impedance Analyzer. Maybelline won a prize in the district competition of the science fair and will make in to the regional competition.

Technology Transfer